

Patent Claims

1. A repair method for repairing a component (1) which comprises a base material with an oriented microstructure, wherein a solder (7, 17) is applied in the region of a site (3) to be repaired, the solder (7, 17) comprising a constituent whose melting temperature is lower than the melting temperature of the base material, and is subsequently soldered to the component (1) by means of a heating effect created by irradiating the solder (7, 17) with a laser, the solder (7) being melted but not the base material of the component (1), a temperature gradient being generated in the region of the site to be repaired during the heating effect so as to generate an oriented microstructure in the repaired site (3), which comprises the same oriented microstructure as the surrounding base material.

2. The repair method as claimed in claim 1, characterized in that the temperature gradient is aligned so that it extends in the direction of the orientation of the oriented microstructure of the base material of the component (1).

3. The repair method as claimed in claim 1 or claim 2, characterized in that the solder (17) comprises a first constituent with a melting temperature which is lower than the melting temperature of the base material of the component (1) and a second constituent with a high durability and a melting temperature which lies above the melting temperature of the first constituent but below the melting temperature of the base material down to the melting temperature of the base material, and in that the solder (17) is applied in the region of the site to be soldered so that the proportion of first constituent in the solder (17) in the vicinity (18) of the base material is higher than in a region (19) further away from the base material.
4. The repair method as claimed in one of claims 1 to 3, wherein the temperature gradient is produced by means of an optical heating process.
5. The repair method as claimed in one of claims 1 to 3, wherein the temperature gradient is produced by means of an inductive heating process.
6. The repair method as claimed in one of claims 1 to 3, wherein the temperature gradient is produced by means of a casting furnace for producing a cast piece with a directionally oriented microstructure.
7. The repair method as claimed in claim 5, wherein the temperature gradient is produced by means of a hot box.
8. The repair method as claimed in one of claims 1 to 7, wherein a heat treatment of the base material is integrated into the process of soldering the solder (7, 17).

9. The repair method as claimed in one or more of the preceding claims, characterized in that the powder of the solder consists at least partially, in particular fully of nanopowder.

10. The repair method as claimed in one or more of the preceding claims, characterized in that the solder is introduced in the form of a paste or a film into the site to be repaired.